

Original Research Article

A Cross-Sectional Study To Evaluate The Prevalence Of Thyroid Disorders Between Diabetic Patients In Hilla City

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Abstract

The aim of the present study was to evaluate the frequency of thyroid dysfunctions between diabetic patients. 150,36 diabetic and non-diabetic subjects, respectively were included in the study. they underwent a laboratory diagnosis for T3,T4,TSH and blood sugar tests.and a demographic data (weight ,height ,age, duration of diabetes ,hypertension, kidney and liver dysfunction) were obtained from them. Results revealed that there was a disturbance in thyroid hormone concentrations among diabetic patients ,The most frequently thyroid dysfunction was subclinical hypothyroidism as there was a decrease in thyroid hormone (T4)concentration.the study concluded that there was a prevalence of thyroid dysfunction among diabetic patient especially among type 2 DM patients as it was high with subclinically hypothyroidism.

Key words: diabetes, hypothyroidism, hyperthyroidism,thyroid dysfunction

الخلاصة

تهدف الدراسة الى تقدير تكرار حالات الاضطرابات في وظيفة الغدة الدرقية بين مرضى السكري . شملت الدراسة ١٥٠ مريض بداء السكري و٣٦ شخص سليم ،خضعوا جميعهم الى الفحص المختبري من اجل قياس هرمونات الغدة الدرقية(T3.T4) وهرمون TSH وقياس مستوى السكر في الدم .كما اخذت المعلومات الاستيعابية من المرضى مثل (الوزن ،الطول،العمر ،مدة الاصابة بمرض السكري ، الاصابة بضغط الدم، اضطرابات مشخصة بالكلى والكبد).اوضحت النتائج وجود اضطرابات في تراكيز هرمونات الغدة الدرقية بين مرضى داء السكري وكانت هذه الاضطرابات من نوع نقص الدرقية وهي الاكثر شيوعا بين مرضى السكري من النوع الثاني.

الكلمات المفتاحية : مرض السكري،نقص الدرقية،فرط الدرقية ،اضطرابات الغدة الدرقية.

Introduction

Thyroid dysfunction and diabetes disease, are two most common endocrine dysfunctions in many populations [1] The correlation between them is viewed widely, from the first studies that were published in 1979 [2].Many studies in various countries were performed for the evaluation of the frequencies of thyroid gland dysfunction in diabetic patients. There is a great variability in the frequency of thyroid

gland disorders in general population.In general populations, the prevalence of these diseases range between 6.6% in United kingdom [3,4]. In contrast, diabetes disease was shows ahigh prevalence 10.8% in the community and up to13.4% in hospitals of diabetic clinic care[5,6].The differences in these prevalence ratios can be explainedby many diagnostic parameters of thyroid dysfunctions, the status of iodineintake among the various regions,

various sensitivities of TSH assays and techniques and the large diversity between populations [7]. The correlation between thyroid dysfunction and diabetes disease is characterized by inextricable interaction of mutual reliance between them. Identification of thyroid dysfunction, especially the subclinical dysfunction, in patients with diabetes disease was justified as most patients can be asymptomatic. Evaluation the prevalence of clinical and subclinical thyroid disease in diabetic patients in populations and its presentation in the course of diabetes with known factors about cardiovascular risk is an important condition [8]. The study was aimed to evaluate the frequencies of thyroid gland dysfunctions in diabetic patients with type 1 and type 2 diabetes in clinical routine in a random community in Hilla city.

Materials and Methods

Study subjects include 150 adult, with known diabetic patients and 36 non-diabetic controls without evidence of thyroid disease.

Diabetes Mellitus (DM) was ruled out in non-diabetic controls using fasting plasma glucose level. Those with FBG < 6.0 mmol/L were accepted as controls.

Venous blood samples of all subjects were collected into plain tubes, allowed to clot and then centrifuged to separate serum by the centrifuge apparatus after 3 hours of

collection. These sera were kept frozen at -20°C until analysis. The collected sera from the 150 Diabetics and the 36 non-diabetic controls were assayed for TSH, T3 and T4.

All subjects underwent a laboratory evaluation. The data were obtained by a survey and a questionnaire protocol, about the variables that would be assessed in this research: gender, age (years), BMI, hypertension, liver dysfunction, kidney and Thyroid Dysfunctions (hyper-thyroidism, hypothyroidism). Thyroid dysfunction was classified as:

- Normal; as T3, T4 and TSH concentrations were in the normal range (70-210 ng/dl for T3; 5.5-11.8 µg/dl for T4 and 0.3-5.5 µIU/ml for TSH).
- clinical- Hypothyroidism ; as TSH concentrations were more than 5.5 mIU/ml and T3, T4 concentrations were less than normal range.
- Subclinical- Hypothyroidism ; as TSH concentrations were more than 5.5 mIU/ml and T3, T4 concentrations were within normal range.
- clinical- Hyperthyroidism ; as TSH concentrations were less than 0.3 mIU/ml and T3, T4 concentrations more than normal range.
- Subclinical- Hyperthyroidism ; as TSH concentrations were less than 0.3 mIU/ml and T3, T4 concentrations were within normal range.

Results

Table 1: Distribution of Sex and age among diabetic and non-diabetic subjects

Group	Male	Female	Mean Age (In Years)
Diabetic patients	61	89	43.16 ± 3.1
Non Diabetic patients	15	21	38.74 ± 5.2

Table 3: Concentrations of TSH and thyroid hormones in diabetic and non- diabetic patients

Hormone con.	diabetic patients (Mean \pm SD)	non diabetic patients (Mean \pm SD)
TSH(uIU/ml)	6.95 \pm 7.43	3.65 \pm 2.01
T3(ng/dl)	121.9 \pm 40.20	149.4 \pm 10.85
T4(ug/dl)	8.09 \pm 2.92	7.68 \pm 0.75

Table 4: Thyroid disorders distribution among diabetic group

Thyroid function	Type1 diabetes N=36		Type2 diabetes N=114	
	Gender			
	Male	Female	Male	Female
Euthyroidism	7	20	25	72
SC- Hypothyroidism	2	2	3	4
C-Hypothyroidism	1	1	2	2
SC-Hyperthyroidism	0	2	2	3
C-Hyperthyroidism	0	1	0	1

Table 5: Some physiological parameters of diabetic and non- diabetic patients

Variable	Type1 diabetes	Type2 diabetes	non diabetic
Diabetes duration (years)	15.6 \pm 3.5	14.9 \pm 8.8	-----
BMI (kg/m ²)	29.3 \pm 1.7	30.2 \pm 4,2	26.45 \pm 4,6
Hypertension(No.)	10	33	2
Dyslipidemia(No.)	9	54	5
Kidney dysfunction(No.)	7	66	14
Liver dysfunction(No.)	3	25	2

Discussion

Patients with diabetes disease were at a higher risk of suffering from thyroid disorders [21]. Thyroid diseases in both the non-diabetic and diabetic patients were reported to be more frequent among women than among men [6].

The study revealed a frequency of thyroid dysfunction between the patients with Type 2 Diabetes was more than that among Type 1 Diabetic patients, as insulin resistance was an important pathological parameter in type 2 diabetes. On the other hand, insulin resistance and cell function are correlated inversely with thyroid stimulating hormone concentrations. The matter that explains the imbalance in insulin concentration was widely associated with thyroid dysfunctions, and it is mediated by β -cells dysfunction [20,22].

Results revealed that the frequency of thyroid dysfunction among the patients with diabetic disease was significant (higher) than among non-diabetic.

Results revealed that subclinical hypothyroidism was a more frequent parameter of thyroid dysfunction found among the patients, a result that resembles other studies already mentioned in the literature [3,4].

In the study by [9], where 126 subjects with diabetic disease from Type 1 Diabetes were evaluated, the frequency of thyroid gland dysfunctions was 20.6%, and the frequency of Subclinical-Hypothyroidism was 13.5% that confirm our data.

In the evaluation of Type 2 Diabetic patients, results revealed the frequency of thyroid dysfunction and Subclinical-Hypothyroidism as in the study of [11]. These results obtained were more than those that obtained in the results of the study of [10], and in the study [12]. Another study showed that the complications of thyroid gland dysfunctions were increased with age [3].

It is important to explain that our patients with Subclinical-Hypothyroidism are older than patients in the two earlier studies that were mentioned above. These findings would be more directed to sub

clinical thyroid gland abnormalities that could clear up the higher frequencies that were found in our study. The subclinical thyroid dysfunctions were mentioned with biochemical disturbances without the presenting of acinical symptoms or signs [13].

The study revealed a frequency of hypertension among the diabetic subjects as compared with the non-diabetic once. Similar study among young adult population was done [14,20] showed similar results.

While dyslipidemia is a reported complication of confirmed hypothyroidism in non-diabetic [15] and diabetic [16] subjects. A study by [10] revealed that there was not any significant relationship that could be found between subclinical-Hypothyroidism and the complaint of dyslipidemia. Another study was reported that thyroid gland hormones were important essentials for the mobilization of tissue lipids especially the brown adipose connective tissues (BATs) which are the body fuel for the production of heat [17].

There was a significant high number of diabetic patients with kidney dysfunction compared with non-diabetic control subjects. Similar results were observed in the study of [18]. Due to high blood sugar there is damage to the nephrons [11]. As a result, kidneys unable to maintain the fluid and electrolytes homeostasis. There is rise in plasma concentration of serum creatinine and urea. In severe hyperglycemia, there is formation of advanced glycation end-products (AGEs) has long been recognized to cause cellular injury. AGEs accelerates increased vascular permeability, basement membrane thickening and mesangial fibrosis. This process leads to renal failure as hyperglycemia is the main cause of liver and blood pressure disorders as a complication of diabetes [19,20].

A restriction of the present study was that one sample of blood only was collected and analyzed for the concentrations of TSH, T3 and T4 hormones, which might

have been the cause of high frequency of thyroid dysfunction. However, the dosage of T4 was not included always in other studies like [4], but the number of diabetic subject can confirm the findings of this study.

The present study was joined with the previous studies that have been determined the frequencies of thyroid gland dysfunctions among diabetic patients for the both two diabetes types (Type 1 & Type 2).

In conclusion, Results of the present cross-sectional study was showed a presence of high frequency of thyroid gland dysfunctions among diabetics. The frequency of a new cases of thyroid dysfunction was identified, and the probable aggravation of some physiological risk factors like dyslipidemia and hypertension, resulting from an unidentified thyroid dysfunctions could lead to an increase in cardiovascular risk among these diabetic patients.

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